Vernal Conjunctivitis as an Atopic Disease

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• In a study of 30 cases of vernal conjunctivitis, antibodies to grass pollen were demonstrated in 16 of 29 patients tested by direct skin tests, in 11 of 30 tested by the Prausnitz-Kustner method and in 22 of 30 by the bis-diazotized benzidine hemagglutination method.

A personal history of major atopic disease was found in 13 of 27 patients, and a family history of atopic disease in 16 of 26 patients questioned.

Conjunctival eosinophilia was found in all cases. Results of the study indicated that vernal conjunctivitis is an atopic disease.

ATOPY, an allergic state that occurs in man, is characterized by skin-sensitizing antibodies called reagin. These antibodies are directed toward various naturally occurring substances such as pollen, house dust, animal danders and occasionally food. About 70 per cent[8] of persons with hypersensitivity of this order report that other members of their immediate families also have it.

The disease usually starts in childhood. The major manifestions of atopy are asthma, perennial allergic rhinitis and atopic dermatitis. A frequent concomitant is eosinophilia in the circulating blood or in material from some local site. The diseases are linked together as part of the atopic syndrome, as they have in common the above characteristics.

The etiologic agents of atopy are not always identified in all cases. Pollen is the cause of hay fever; house dust and epidermal products are the cause of certain cases of perennial asthma and allergic rhinitis. Some cases of atopic dermatitis have been traced to one or more of the atopens. However, the etiologic agent or agents that are supposed to be basic in cases of atopic disease have not always been found.

Until evidence to the contrary is presented, the atopic diseases should be investigated clinically and experimentally as a variation of the same basic abnormality, for two compelling reasons: (1) Different types of atopic disease often occur at the same time or serially in the same patient or family; (2) the same group of antigens has been found to be responsible in all of the diseases at one time or another.

Vernal conjunctivitis is an eye disease of childhood, with many of the characteristics of an allergic reaction. Its most striking feature is the cobblestone excrescence on the underside of the upper lid.

Is vernal conjunctivitis an atopic disease? Since there was no diagnostic or laboratory test to give the answer, we selected 30 patients with vernal conjunctivitis and measured them by the laboratory criteria used in patients with hay fever, namely: (1) positive reaction to skin tests with grass pollen; (2) serum antibodies to grass as demonstrated by the Prausnitz-Kustner (P-K) serum passive transfer test and the bis-diazotized benzidine hemagglutination technique.[5]

Hay fever was selected because it has, in common with vernal conjunctivitis, the remarkable feature of exacerbation in the spring and subsidence in the winter. Rye grass was selected as the antigen for the hemagglutination test for two reasons: (1) Grasses (with the possible exception of Bermuda) have antigens in common,[4] so that the group may be represented, although not entirely, by one grass; (2) rye grass is one of the most common offenders to hay fever sufferers in the State of California.

MATERIALS AND METHODS

Patients in whom vernal conjunctivitis was diagnosed by an ophthalmologist were referred to the Francis I. Proctor Foundation for Ophthalmological Research for examination or were observed in the referring physician's office. All but three of the patients were examined by the author. Patients in whom clinically there was some doubt as to a diagnosis of vernal conjunctivitis, and also those who had a history of past vernal conjunctivitis but did not have the disease at the time of examination were excluded from the study.

A history, cultures of materials from the conjunctiva and lids and smears for eosinophils were taken. Blood was drawn for P-K and hemagglutination studies. Intradermal skin tests were performed on the forearm, using 0.05 of a 1:660 dilution of mixed California grasses, a 1:660 dilution of rye grass (Lolium perenne), and a control of diluting (Coca's) solution; reactions were read in 15 and 30 minutes in all cases.

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TABLE 1.—*Summary of Allergic Data on Patients with Vernal Conjunctivitis*

Type of Examination	No. Examined	Positive	Questionable
Antibodies to grass pollen as demonstrated by:			
Direct skin test	29	16	5
P-K* test	30	10	0
Hemagglutination reaction	30	22	0
Major atopic disease found in:			
Personal history	27	13	1
Family history	26	16	1
Exacerbation in spring	26	17	5

*Prausnitz-Kustner.

Two groups were used as controls in the antibody studies. Twenty-six patients with seasonal hay fever served as positive controls. All had positive reactions to skin tests with grass, and 19 had hemagglutinating antibody to grass in their blood. Thirteen of the hay fever patients were hyposensitized to grass —ten currently, three having been treated in the past. (Current hyposensitization results in the formation of hemagglutinating antibody to grass in an allergic or nonallergic person.)[7] The normal controls consisted of 60 persons, mostly children, who had no history of hay fever and who had negative reaction to skin tests. All hemagglutination tests in this group were negative.

RESULTS

Twenty-nine of the 30 patients were skin tested; 21 had skin-sensitizing antibody to grass as demonstrated by the intradermal direct skin test. In ten the reaction was strongly positive (+++ to ++++), in six it was moderately positive (+ to ++) and in five weakly or questionably positive±). (See Table 1.) As might be expected, the ten patients who had positive reaction to the P-K test were among those who had moderately to strongly positive response to skin tests. However, hemagglutinating antibody was found in about the same incidence in the strongly, the moderately and the weakly positive groups. Twenty-two of the 30 patients had hemagglutinating antibody to rye grass in the blood. The hemagglutination test and its relation to vernal conjunctivitis and other atopic antibodies is discussed elsewhere.[2]

Personal or family history was considered "positive" only if there was report of one of the major allergic sensitivities. With the use of this criterion, 13 of 27 patients had a positive personal history and 16 of 26 patients had a positive family history. Over half of the patients reported that in the spring and summer they had definite exacerbation of the ocular symptoms—itching, lacrimation, photophobia and burning. The worst months were May, June and July.

Specimens of material from the conjunctiva were examined in 15 cases and a significant number of eosinophils was noted in all of them. No disease was uncovered by culture of material from the conjunctivae and the eyelids.

Twenty-three of the 30 patients were under 15 years of age. The average age for those less than 15 was 8.4 years and the average age for all patients was 12.8 years. Twenty-five of the 30 patients were males, a preponderance that has been observed in almost all reports on vernal conjunctivitis.[1,3,6] No endocrine peculiarity has been found to explain this phenomenon.

DISCUSSION

Clinical evidence in vernal conjunctivitis, as well as the presence of serum antibodies in persons with hay fever and not in normal subjects, would indicate that this disease is atopic. The correlation of positive reaction to skin tests, seasonal variation of disease and the presence of antibody to rye grass strongly incriminates grass as an etiologic or influencing factor in vernal conjunctivitis. Patients who did not have serum antibodies usually also had negative reaction to skin tests and had no seasonal variation of disease.

If vernal conjunctivitis is an atopic disease with grass pollen sensitivity as the etiologic or influencing factor, it is reasonable to assume that some cases would be caused by other atopic allergens such as house dust, animal danders or other perennial antigens. Pertinently, hay fever symptoms of sneezing, lacrimation, itching of the nose and rhinitis are not all from grass; house dust and epidermals also can be the cause.

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